

McKinstry

Presentation to:

**Blaine County School District
Levy Committee**



August, 2009

Presentation Highlights

- Current HVAC systems and priorities
- What is an Elevated Baseline?
- Ground source heat pumps
- Project Cost Avoided Savings
- How is this project Sustainable?
- Integrated Curriculum
- Project Summary
- Building Summary
- Bulleted Items for Levy Flyer

HVAC System Priorities

- Under-Ventilating Systems (Life Safety)
- Buildings without Cooling (Security)
- Aging, Problematic Systems (Maintenance Costs)
- Large Utility Users (Largest Cost Avoided Savings)
- Inefficient Systems (Additional Cost Avoided Savings)

Opportunities at Each Building

	Under-Ventilating Systems	Buildings without Cooling	Aging Problematic Systems	Large Utility Consumers	Inefficient Systems
Bellevue Elementary	X	X	X		X
Carey Elementary	X	X	X		X
Carey Gym	To Be Verified	X			X
Carey High School	To Be Verified				
Hailey Elementary	To Be Verified	X	X	X	X
Hemmingway Elementary	X	X	X		X
Wood River High School	To Be Verified			X	
Wood River Middle School	To Be Verified			X	
Woodside Elementary	To Be Verified				
District Support Services	To Be Verified				
Community Campus	To Be Verified		X	X	

Elevated Baseline

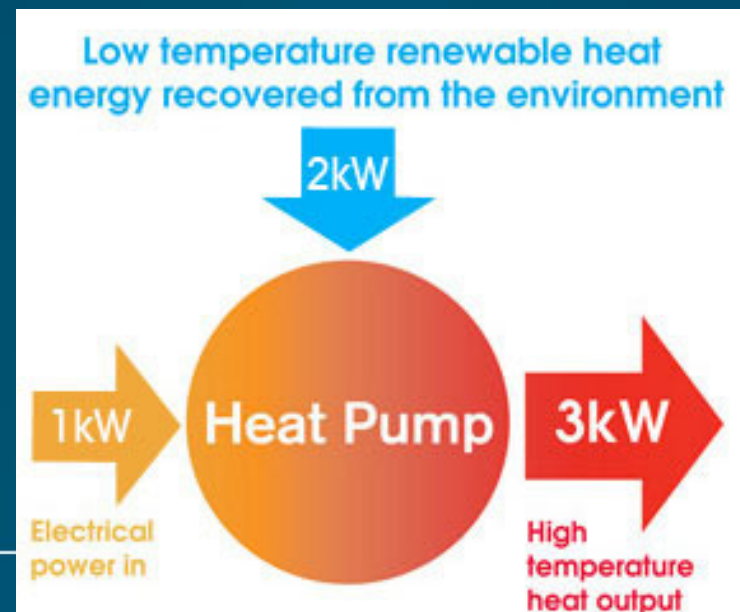
- This applies to buildings that are either under-ventilated or do not have cooling.
 - Bellevue Elementary
 - Carey Elementary
 - Carey Gym
 - Hemmingway Elementary
 - Hailey Elementary
- Increasing ventilation in the older buildings to code levels is a desire of the school district to increase the indoor air quality of the older buildings, which reduces the spread of germs.
- Adding cooling to the buildings is a desire to increase security so that teachers do not need doors opened for comfort.

Elevated Baseline

- Increasing ventilation is a code requirement, and to get to that level, systems will need to be run more, which will increase cost. (e.g. Garden Valley)
- Increasing ventilation rates increases utility consumption. Additional outside air is brought into the building to increase indoor air quality; when this air is cooler than the room temperature, more heat must be added to this outside air to keep the room at the proper temperature
- Adding cooling to the buildings, increases occupant comfort and increases utility consumption. It takes extra energy that was not consumed beforehand to keep the room temperatures in a comfortable range.

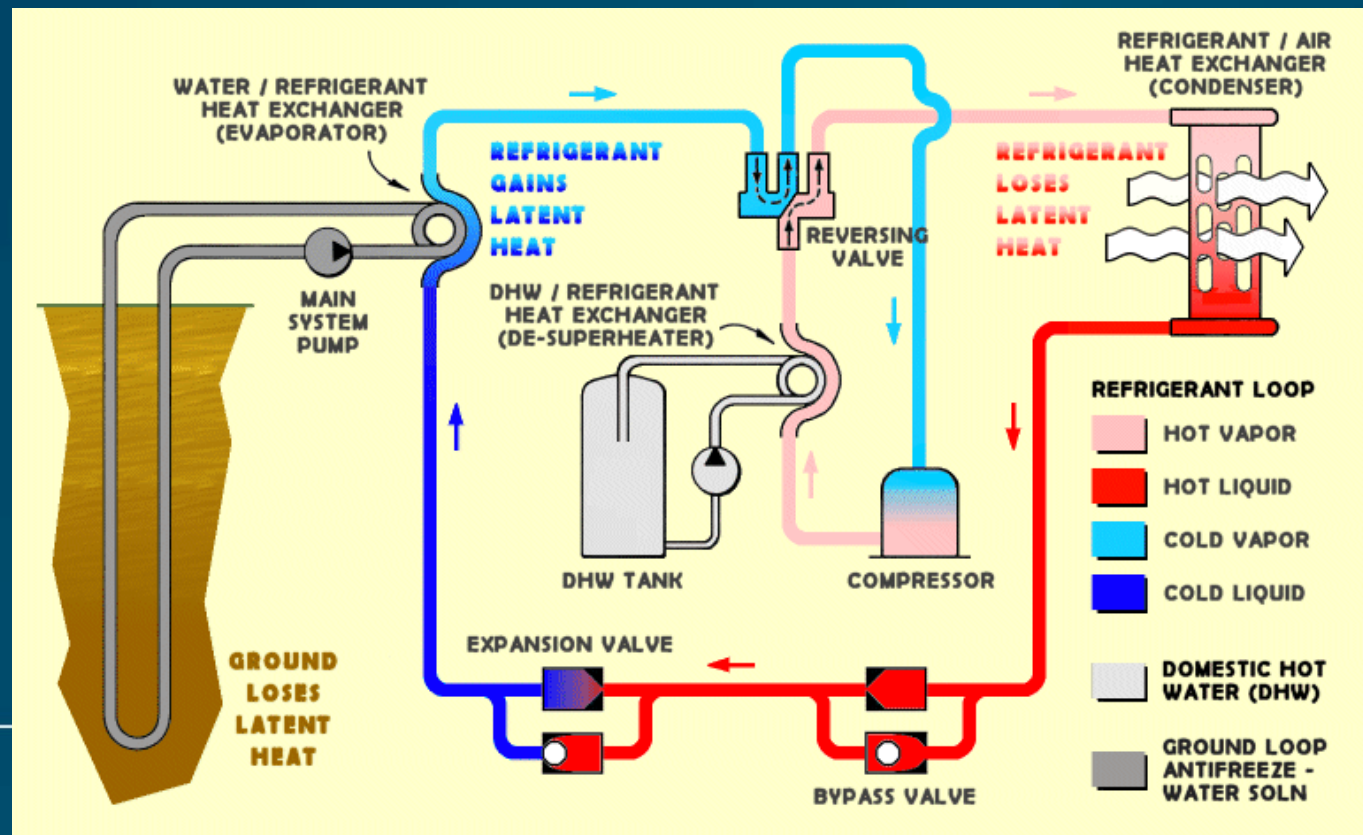
Benefits of Ground Source Heat Pump Loop

- Very efficient system
- Possible \$5M Fed Grant
- Another \$190k+ Estimated utility incentives
- Approx. \$150k Cost Avoided Savings



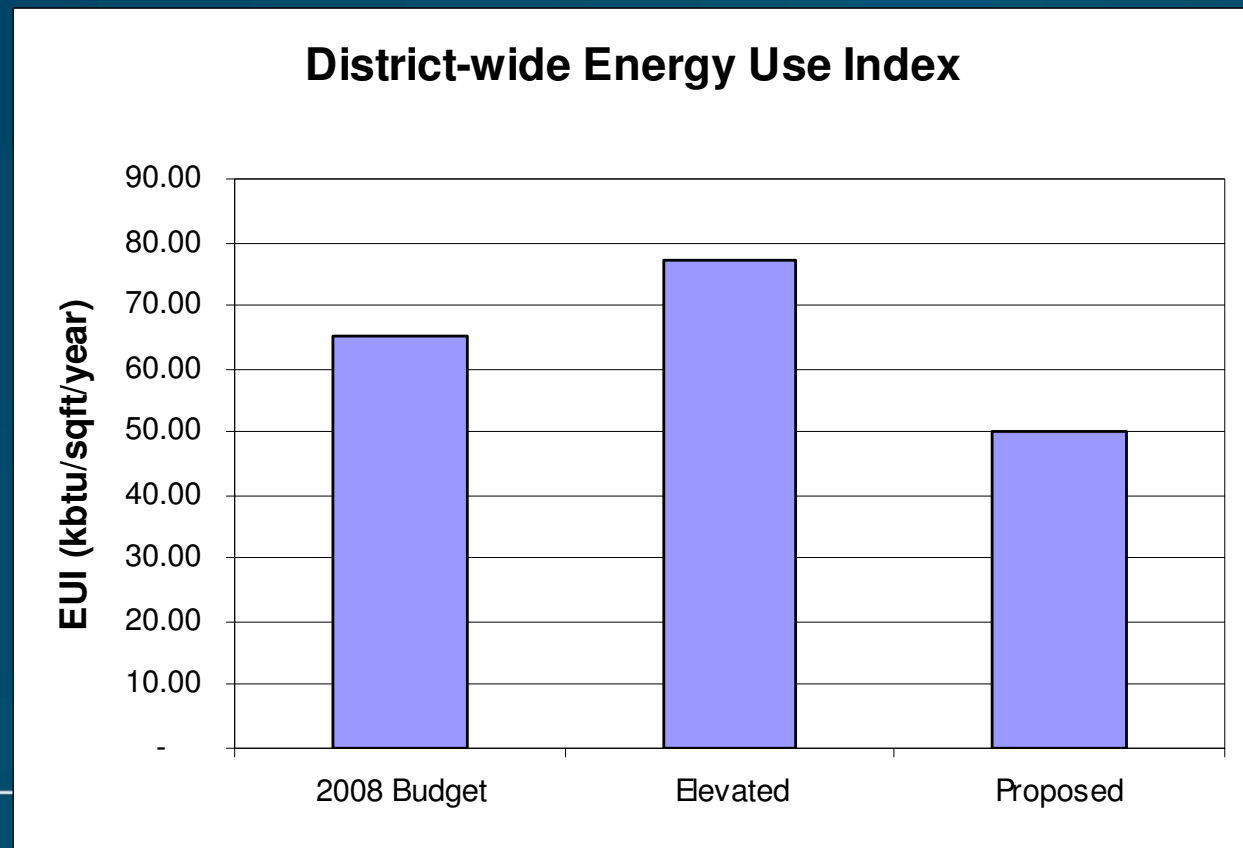
How Ground Source Heat Pumps Work

- Heat Pumps basically transfer heat from the ground to the building during the winter and heat from the building to the ground during the summer. So for a small amount of electricity to “move” the heat, the building can be heated or cooled “freely” from the earth.



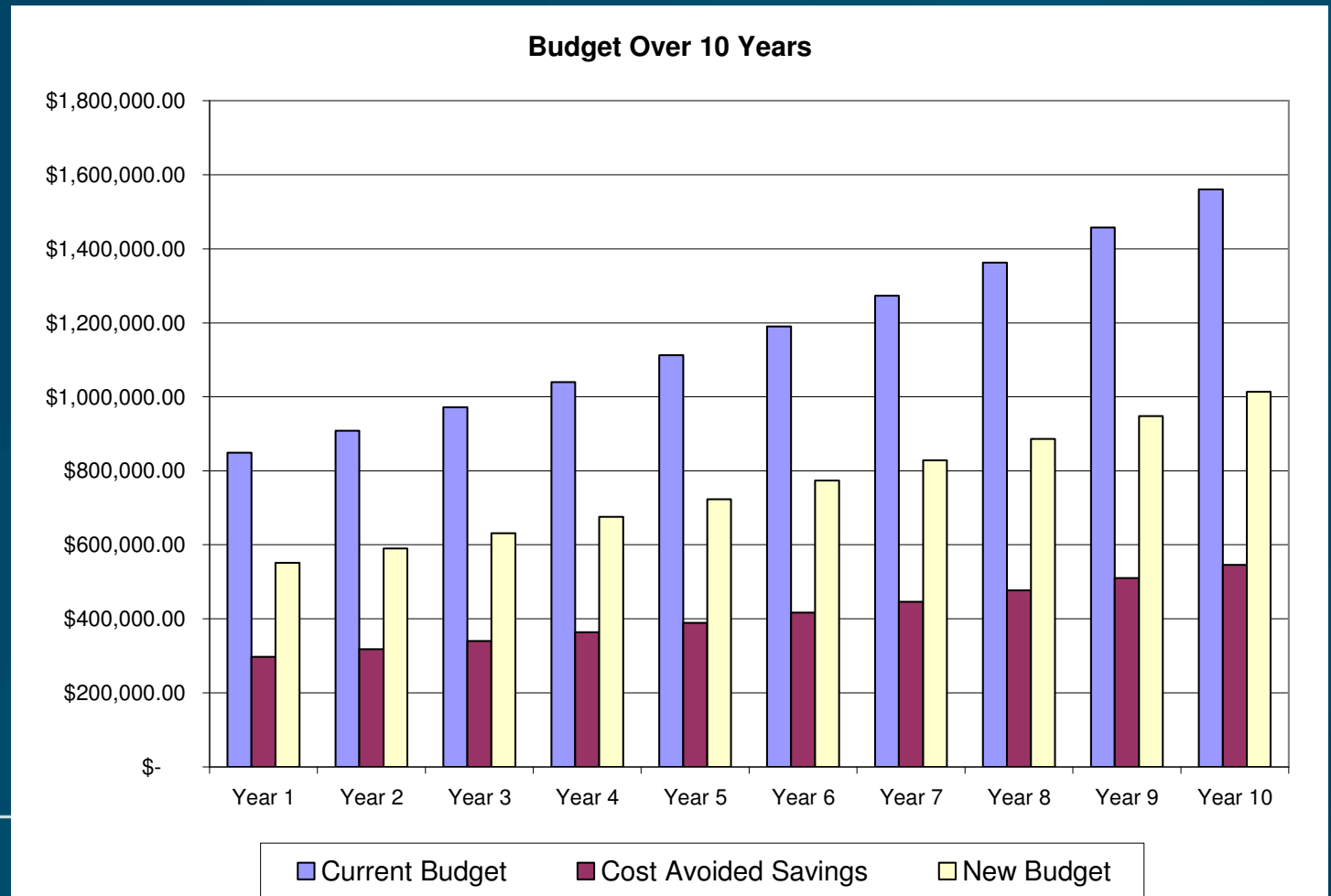
District Energy Use After Energy Services Project

- 35% Estimated Savings over Elevated Baseline
- First year cost avoided savings over \$300k



Savings Tomorrow

- $\text{New Budget} = \text{Current Elevated Budget} - \text{Cost Avoided Savings}$

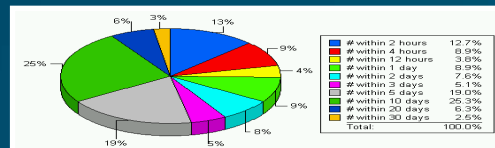
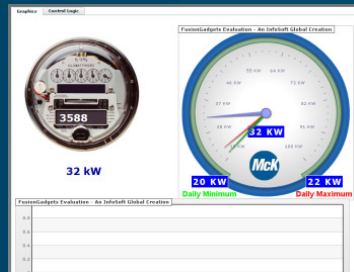
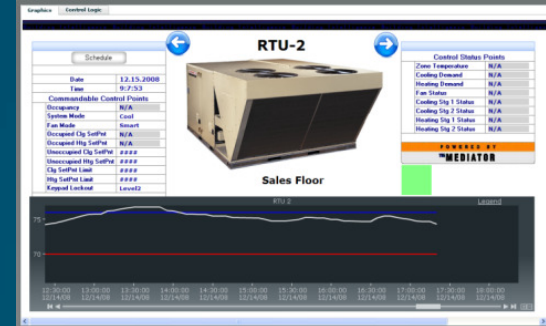


How is this Project Sustainable?

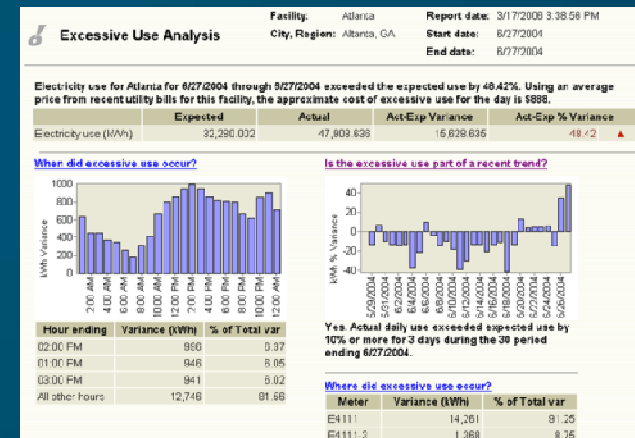
- **A healthy productive learning environment**
 - Designing **HVAC systems and the building envelope** to provide a **comfortable thermal environment** and following up with a thermal comfort survey of building occupants to assess actual comfort over time.
 - **Improved air flow** and increased ventilation to improve indoor air quality for occupant comfort, well-being, and productivity.
- **Financial Savings**
 - **Commissioning** of the schools energy systems resulting in **reduced energy use, lower operating costs**, and reducing contractor callbacks. Commissioning provides verification that the system performs in accordance with the school's requirements.
 - Designing the **HVAC system, lighting** and other systems to **optimize energy performance**, saving operational costs resulting in substantial energy incentives.
- **Hands-on Learning**
 - Using the **school as a teaching tool** by coordinating closely with the school administration and integrating the sustainable features with the school's educational curriculum.
 - The project can **serve as a reminder** that small changes can make a big impact; **bike to school, recycle, buy local**.

Integrated Curriculum

- Students as Teachers
- Website Games and Activities
- National Competitions
- Energy-use Monitoring
- Growing a Garden
- Professional Path (Green Jobs)
- Possible Internships



Category	# within 2 hours	# within 4 hours	# within 12 hours	# within 1 day	# within 2 days	# within 3 days	# within 6 days	# within 10 days	# within 30 days
21550 - Information Technology	2	0	0	2	0	0	0	0	0
21600 - Engineering	1	0	1	0	1	0	0	0	0
21800 - Micros Genetics Vibeaters	1	1	1	0	1	0	0	0	0
21900 - GNF Admin Assistants	2	0	0	2	0	0	0	0	0



Project Description

Energy Services Project

The proposed project includes all the measures discussed prior to this point, but eliminates redundancy with the Goal 7 and Goal 8 Committees. This project also adds a geothermal ground source option, with the potential for \$5M in grants specifically to fund that part of the project.

Geothermal Ground Source Measure

This project has a large ground source heat pump measure that includes HVAC Retrofits or Replacements at 8 buildings and well development at 5 sites.

Wood River HS Campus (High School, Community Campus, Support Services)
Wood River Middle School
Woodside Elementary
Bellevue Elementary
Carey Campus (Carey Elementary, Carey Gym, Carey High School)

Project Financial Summary

	Project with Geothermal
Project Cost	\$31.5M - \$35.1M
Potential Grants/Rebates/Incentives	Approx. \$5.3M ++
Net Customer Cost	\$26.2M - \$29.8M
Est. Cost Avoided Annual Savings	\$300,000+

Bellevue Elementary

Measures

- Lighting and Controls
- Water Fixture Retrofit
- Irrigation Improvements
- Verdiem (Network automated computer shutdown)
- Plug Load Control
- Freezer Temp Control
- Solar Power (20kW)
- **Ground Source Heat Pump and Well Development**
 - **HVAC Retrofit**
 - **HVAC Controls Retrofit – DCV, Economizer**



- Solar Snow Melt
- Door Retrofit
- Catwalk access to Gym H&V units
- Install Drop Ceiling
- Multipurpose Room
- LEED-EB

Carey Campus

Measures

- Irrigation Improvements
- **Geothermal Well Development**
- Waste Management
- Covered Walkway



Carey Elementary

Measures

- Lighting and Controls
- Water Fixture Retrofit
- Verdiem (Network automated computer shutdown)
- Plug Load Control
- Vending Miser Install
- Solar Power (20kW)
- Repair Ductwork Insulation
- **Ground Source Heat Pump Installation**
 - **HVAC Controls Retrofit – DCV, Economizer**
 - **HVAC Retrofit**



- Window Retrofit
- Door Retrofit
- Install Drop Ceiling
- LEED-EB

Carey Gym

Measures

- Lighting and Controls (covered in Carey High School price)
- Water Fixture Retrofit
- Vending Miser Install
- Domestic Hot Water Temp Adjust
- **Ground Source Heat Pump Installation**
 - **Cooling Addition**
 - **HVAC Controls Retrofit – DCV, Economizer**
- Catwalk access to H&V units
- LEED-EB



Carey High School

Measures

- Lighting and Controls
 - Verdiem (Network automated computer shutdown)
 - Plug Load Control
 - Vending Miser Install
 - Domestic Hot Water Temp Adjust
 - Cooling Addition
 - **Ground Source Heat Pump Installation**
 - **HVAC Controls Retrofit – DCV**
 - Solar Power (20kW)
- 
- A photograph of the exterior of Carey High School. The building is a long, single-story brick structure with a prominent entrance on the right side. The foreground is a well-maintained green lawn, and the sky is clear and blue.
- Domestic Hot Water Recirc Loop Repair
 - Door Retrofit
 - Retro-Commissioning
 - LEED-EB

District Office Building

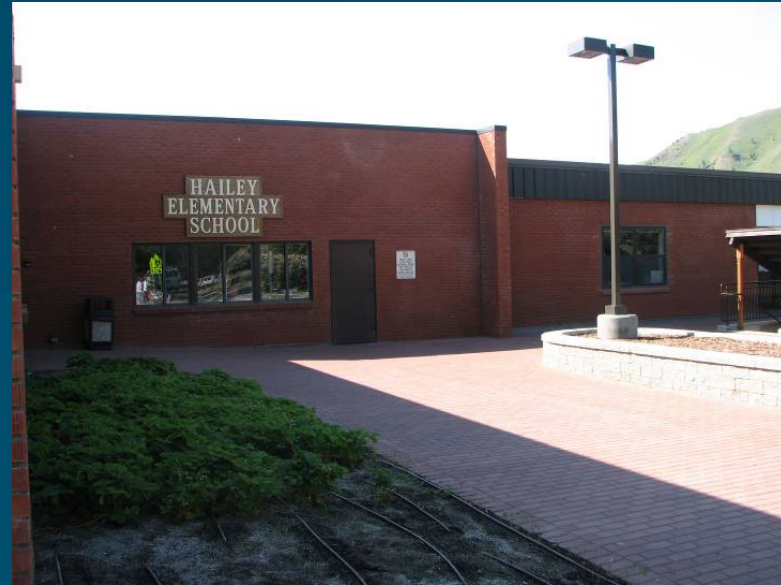
Measures

- HVAC Controls Retrofit – DCV, Economizer
- Verdiem (Network automated computer shutdown)
- Plug Load Control
- LEED-EB

Hailey Elementary

Measures

- Lighting and Controls
- Transformer Move - Consolidation
- Water Fixture Retrofit
- Irrigation Improvements
- Verdiem (Network automated computer shutdown)
- Plug Load Control
- Vending Miser Install
- Ground Source Heat Pump and Well Development
 - HVAC Retrofit
 - HVAC Controls Retrofit – DCV, Economizer



- Window Retrofit
- Carpet Replacement
- Door Retrofit
- Kitchen Remodel
- Install Drop Ceiling
- LEED-EB
- Solar Power (20kW)
- Solar Snow Melt

Hemmingway Elementary

Measures

- Lighting and Controls
- Day Lighting
- Water Fixture Retrofit
- Verdiem (Network automated computer shutdown)
- Plug Load Control
- Vending Miser Install
- Solar Power (20kW)
- Solar Snow Melt
- **Ground Source Heat Pump and Well Development**
 - **HVAC Retrofit**
 - **HVAC Controls Retrofit – DCV, Economizer**



- Carpet Replacement
- Door Retrofit
- Covered Walkway (This would take the place of Solar Snow Melt)
- LEED-EB

Community Campus

Measures

- Lighting and Controls
- Water Fixture Retrofit
- Verdiem (Network automated computer shutdown)
- Plug Load Control
- **Ground Source Heat Pump Installation**
 - **HVAC Retrofit**
 - **HVAC Controls Optimization**
- Install VFD on HP loop pump
- Solar Power (20kW)



- Auditorium Architectural Improvements
- Door Retrofit
- Retro-Commissioning
- Install Drop Ceiling
- LEED-EB

Support Services

Measures

- Lighting and Controls
- Water Fixture Retrofit
- Verdiem (Network automated computer shutdown)
- Plug Load Control
- HVAC Retrofit – (Moving bus garage heaters for optimal use)
- Ground Source Heat Pump Installation
 - HVAC Controls Optimization
- Waste Oil Furnace
- Solar Power (20kW)
- Retro – Commissioning
- LEED-EB



Wood River High School

Measures

- Lighting and Controls
- Irrigation Improvements
- Field Turf Install
- Verdiem (Network automated computer shutdown)
- Ground Source Heat Pump Replacement
 - HVAC Controls Optimization - Economizer
- Plug Load Control
- Install VFD on HP Loop Pump
- Solar Power (20kW)
- Solar Snow Melt



- Heat Recovery for Domestic hot water
- Retro-Commission
- LEED-EB

Wood River High School Campus

Measures

- Geothermal Project – The project costs shown here include Ground source heat pumps and the associated well development at Wood River Middle School, Wood River High School Campus, and Woodside Elementary
- Waste Management



Wood River Middle School

Measures

- Lighting and Controls
- Verdiem (Network automated computer shutdown)
- Plug Load Control
- Install VFD on HP Loop Pump
- Ground Source Heat Pump Installation and Well Development (Costs shown under Wood River High School Campus)
 - HVAC Controls Optimization – DCV, Economizer
- Solar Power (20kW)



- Waste Management
- Retro-Commissioning
- LEED-EB

Woodside Elementary

Measures

- Lighting and Controls
- Irrigation Improvements
- Verdiem (Network automated computer shutdown)
- Plug Load Control
- Ground Source Heat Pump Well Development (Costs shown under Wood River High School Campus)
 - HVAC Controls Optimization – DCV
- Install VFD on HP Loop Pump



- Solar Power (20kW)
- Retro-Commissioning
- LEED-EB

Condensed Information For Pamphlet

- Several buildings need new HVAC systems to provide proper ventilation and cooling.
- New Ground Source Heat Pump systems would provide efficient, sustainable, and cost-effective heating and cooling for all the schools in the district. Potential for \$5M federal grant.
- The energy project, including ground source heat pump systems, would provide over \$300k of cost avoided savings, cumulating in over \$4M in cost avoided savings over the next 10 years. These savings would be guaranteed by the energy services company.
- Sustainability aspects of project:
 - Healthy, productive learning environment
 - Financial Savings
 - Hands-on Learning

Questions?